

establishment of a quiet zone should be followed.

III. ENGINEERING ASMS

A. Engineering improvements, other than modified SSMs, may be used in the creation of a Quiet Zone. These engineering improvements, which will be treated as ASMs under this appendix, may include improvements that address underlying geometric conditions, including sight distance, that are the source of increased risk at the crossing.

B. The effectiveness of an Engineering ASM will be determined as follows:

1. Establish the quarterly (three months) baseline violation rate for the crossing at which the Engineering ASM will be applied.

a. A violation in this context refers to a motorist not complying with the automatic warning devices at the crossing (not stopping for the flashing lights and driving over the crossing after the gate arms have started to descend, or driving around the lowered gate arms). A violation does not have to result in a traffic citation for the violation to be considered.

b. Violation data may be obtained by any method that can be shown to provide a statistically valid sample. This may include the use of video cameras, other technologies (e.g. inductive loops), or manual observations that capture driver behavior when the automatic warning devices are operating.

c. If data is not collected continuously during the quarter, sufficient detail must be provided in the application in order to validate that the methodology used results in a statistically valid sample. FRA recommends that at least a minimum of 600 samples (one sample equals one gate activation) be collected during the baseline and subsequent quarterly sample periods.

d. The sampling methodology must take measures to avoid biases in their sampling technique. Potential sampling biases could include: Sampling on certain days of the week but not others; sampling during certain times of the day but not others; sampling immediately after implementation of an ASM while the public is still going through an adjustment period; or applying one sample method for the baseline rate and another for the new rate.

e. The baseline violation rate should be expressed as the number of violations per gate activations in order to normalize for unequal gate activations during subsequent data collection periods.

f. All subsequent quarterly violation rate calculations must use the same methodology as stated in this paragraph unless FRA authorizes another methodology.

2. The Engineering ASM should be initiated at the crossing. Train horns are still being sounded during this time period.

3. In the calendar quarter following initiation of the Engineering ASM, determine a

new quarterly violation rate using the same methodology as in paragraph (1) above.

4. Determine the violation rate reduction for the crossing by the following formula:

Violation rate reduction = (new rate – baseline rate)/baseline rate

5. Using the Engineering ASM effectiveness rate, determine the Quiet Zone Risk Index. If and when the Quiet Zone Risk Index for the proposed quiet zone has been reduced to a risk level at or below the Risk Index With Horns or the Nationwide Significant Risk Threshold, the public authority may apply to FRA for approval of the quiet zone. Upon receiving written approval of the quiet zone application from FRA, the public authority may then proceed with notifications and implementation of the quiet zone.

6. Violation rates must be monitored for the next two calendar quarters. Unless otherwise provided in FRA's notification of quiet zone approval, if the violation rate for these two calendar quarters does not exceed the violation rate that was used to determine the effectiveness rate that was approved by FRA, the public authority can cease violation rate monitoring.

7. In the event that the violation rate over either of the next two calendar quarters are greater than the violation rate used to determine the effectiveness rate that was approved by FRA, the public authority may continue the quiet zone for a third calendar quarter. However, if the third calendar quarter violation rate is also greater than the rate used to determine the effectiveness rate that was approved by FRA, a new effectiveness rate must be calculated and the Quiet Zone Risk Index re-calculated using the new effectiveness rate. If the new Quiet Zone Risk Index exceeds the Risk Index With Horns and the Nationwide Significant Risk Threshold, the procedures for dealing with unacceptable effectiveness after establishment of a quiet zone should be followed.

APPENDIX C TO PART 222—GUIDE TO ESTABLISHING QUIET ZONES

Introduction

This Guide to Establishing Quiet Zones (Guide) is divided into five sections in order to address the variety of methods and conditions that affect the establishment of quiet zones under this rule.

Section I of the Guide provides an overview of the different ways in which a quiet zone may be established under this rule. This includes a brief discussion on the safety thresholds that must be attained in order for train horns to be silenced and the relative merits of each. It also includes the two general methods that may be used to reduce risk in the proposed quiet zone, and the different impacts that the methods have on the quiet zone implementation process. This section

also discusses Partial (e.g. night time only quiet zones) and Intermediate Quiet Zones. An Intermediate Quiet Zone is one where horn restrictions were in place after October 9, 1996, but as of December 18, 2003.

Section II of the Guide provides information on establishing New Quiet Zones. A New Quiet Zone is one at which train horns are currently being sounded at crossings. The Public Authority Designation and Public Authority Application to FRA methods will be discussed in depth.

Section III of the Guide provides information on establishing Pre-Rule Quiet Zones. A Pre-Rule Quiet Zone is one where train horns were not routinely sounded as of October 9, 1996 and December 18, 2003. The differences between New and Pre-Rule Quiet Zones will be explained. Public Authority Designation and Public Authority Application to FRA methods also apply to Pre-Rule Quiet Zones.

Section IV of the Guide deals with the required notifications that must be provided by public authorities when establishing both New and continuing Pre-Rule or Intermediate Quiet Zones.

Section V of the Guide provides examples of quiet zone implementation.

SECTION I—OVERVIEW

In order for a quiet zone to be qualified under this rule, it must be shown that the lack of the train horn does not present a significant risk with respect to loss of life or serious personal injury, or that the significant risk has been compensated for by other means. The rule provides four basic ways in which a quiet zone may be established. Creation of both New Quiet Zones and Pre-Rule Quiet Zones are based on the same general guidelines; however, there are a number of differences that will be noted in the discussion on Pre-Rule Quiet Zones.

A. Qualifying Conditions

(1) One of the following four conditions or scenarios must be met in order to show that the lack of the train horn does not present a significant risk, or that the significant risk has been compensated for by other means:

a. One or more SSMs as identified in appendix A are installed at each public crossing in the quiet zone; or

b. The Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold without implementation of additional safety measures at any crossings in the quiet zone; or

c. Additional safety measures are implemented at selected crossings resulting in the Quiet Zone Risk Index being reduced to a level equal to, or less than, the Nationwide Significant Risk Threshold; or

d. Additional safety measures are taken at selected crossings resulting in the Quiet Zone Risk Index being reduced to at least

the level of the Risk Index With Horns (that is, the risk that would exist if train horns were sounded at every public crossing in the quiet zone).

(2) It is important to consider the implications of each approach before deciding which one to use. If a quiet zone is qualified based on reference to the Nationwide Significant Risk Threshold (i.e. the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold—see the second and third scenarios above), then an annual review will be done by FRA to determine if the Quiet Zone Risk Index remains equal to, or less than, the Nationwide Significant Risk Threshold. Since the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index may change from year to year, there is no guarantee that the quiet zone will remain qualified. The circumstances that cause the disqualification may not be subject to the control of the public authority. For example, an overall national improvement in safety at gated crossings may cause the Nationwide Significant Risk Threshold to fall. This may cause the Quiet Zone Risk Index to become greater than the Nationwide Significant Risk Threshold. If the quiet zone is no longer qualified, then the public authority will have to take additional measures, and may incur additional costs that might not have been budgeted, to once again lower the Quiet Zone Risk Index to at least the Nationwide Significant Risk Threshold in order to retain the quiet zone. Therefore, while the initial cost to implement a quiet zone under the second or third scenario may be lower than the other options, these scenarios also carry a degree of uncertainty about the quiet zone's continued existence.

(3) The use of the first or fourth scenarios reduces the risk level to at least the level that would exist if train horns were sounding in the quiet zone. These methods may have higher initial costs because more safety measures may be necessary in order to achieve the needed risk reduction. Despite the possibility of greater initial costs, there are several benefits to these methods. The installation of SSMs at every crossing will provide the greatest safety benefit of any of the methods that may be used to initiate a quiet zone. With both of these methods (first and fourth scenarios), the public authority will never need to be concerned about the Nationwide Significant Risk Threshold, annual reviews of the Quiet Zone Risk Index, or failing to be qualified because the Quiet Zone Risk Index is higher than the Nationwide Significant Risk Threshold. Public authorities are strongly encouraged to carefully consider both the pros and cons of all of the methods and to choose the method that will best meet the needs of its citizens by providing a safer and quieter community.

(4) For the purposes of this Guide, the term “Risk Index with Horns” is used to represent the level of risk that would exist if train horns were sounded at every public crossing in the proposed quiet zone. If a public authority decides that it would like to fully compensate for the lack of a train horn and not install SSMS at each public crossing in the quiet zone, it must reduce the Quiet Zone Risk Index to a level that is equal to, or less than, the Risk Index with Horns. The Risk Index with Horns is similar to the Nationwide Significant Risk Threshold in that both are targets that must be reached in order to establish a quiet zone under the rule. Quiet zones that are established by reducing the Quiet Zone Risk Index to at least the level of the Nationwide Significant Risk Threshold will be reviewed annually by FRA to determine if they still qualify under the rule to retain the quiet zone. Quiet zones that are established by reducing the Quiet Zone Risk Index to at least the level of the Risk Index with Horns will not be subject to annual reviews.

(5) The use of FRA’s web-based Quiet Zone Calculator is recommended to aid in the decision making process (<http://www.fra.dot.gov/us/content/1337>). The Quiet Zone Calculator will allow the public authority to consider a variety of options in determining which SSMS make the most sense. It will also perform the necessary calculations used to determine the existing risk level and whether enough risk has been mitigated in order to create a quiet zone under this rule.

B. Risk Reduction Methods

FRA has established two general methods to reduce risk in order to have a quiet zone qualify under this rule. The method chosen impacts the manner in which the quiet zone is implemented.

1. *Public Authority Designation (SSMs)*—The Public Authority Designation method (§222.39(a)) involves the use of SSMS (see appendix A) at some or all crossings within the quiet zone. The use of only SSMS to reduce risk will allow a public authority to designate a quiet zone without approval from FRA. If the public authority installs SSMS at every crossing within the quiet zone, it need not demonstrate that they will reduce the risk sufficiently in order to qualify under the rule since FRA has already assessed the ability of the SSMS to reduce risk. In other words, the Quiet Zone Calculator does not need to be used. However, if only SSMS are installed within the quiet zone, but not at every crossing, the public authority must calculate that sufficient risk reduction will be accomplished by the SSMS. Once the improvements are made, the public authority must make the required notifications (which includes a copy of the report generated by the Quiet Zone Calculator showing that the

risk in the quiet zone has been sufficiently reduced), and the quiet zone may be implemented. FRA does not need to approve the plan as it has already assessed the ability of the SSMS to reduce risk.

2. *Public Authority Application to FRA (ASMs)*—The Public Authority Application to FRA method (§222.39(b)) involves the use of ASMs (see appendix B). ASMs include modified SSMS that do not fully comply with the provisions found in appendix A (e.g., shorter than required traffic channelization devices), non-engineering ASMs (e.g., programmed law enforcement), and engineering ASMs (i.e., engineering improvements other than modified SSMS). If the use of ASMs (or a combination of ASMs and SSMS) is elected to reduce risk, then the public authority must provide a Notice of Intent and then apply to FRA for approval of the quiet zone. The application must contain sufficient data and analysis to confirm that the proposed ASMs do indeed provide the necessary risk reduction. FRA will review the application and will issue a formal approval if it determines that risk is reduced to a level that is necessary in order to comply with the rule. Once FRA approval has been received and the safety measures fully implemented, the public authority would then provide a Notice of Quiet Zone Establishment and the quiet zone may be implemented. The use of non-engineering ASMs will require continued monitoring and analysis throughout the existence of the quiet zone to ensure that risk continues to be reduced.

3. *Calculating Risk Reduction*—The following should be noted when calculating risk reductions in association with the establishment of a quiet zone. This information pertains to both New Quiet Zones and Pre-Rule Quiet Zones and to the Public Authority Designation and Public Authority Application to FRA methods.

Crossing closures: If any public crossing within the quiet zone is proposed to be closed, include that crossing when calculating the Risk Index with Horns. The effectiveness of a closure is 1.0. However, be sure to increase the traffic counts at other crossings within the quiet zone and recalculate the risk indices for those crossings that will handle the traffic diverted from the closed crossing. It should be noted that crossing closures that are already in existence are not considered in the risk calculations.

Example: A proposed New Quiet Zone contains four crossings: A, B, C and D streets. A, B and D streets are equipped with flashing lights and gates. C Street is a passive crossbuck crossing with a traffic count of 400 vehicles per day. It is decided that C Street will be closed as part of the project. Compute the risk indices for all four streets. The calculation for C Street will utilize flashing lights and gates as the warning device. Calculate the Crossing Corridor Risk Index by

averaging the risk indices for all four of the crossings. This value will also be the Risk Index with Horns since train horns are currently being sounded. To calculate the Quiet Zone Risk Index, first re-calculate the risk indices for B and D streets by increasing the traffic count for each crossing by 200. (Assume for this example that the public authority decided that the traffic from C Street would be equally divided between B and D streets.) Increase the risk indices for A, B and D streets by 66.8% and divide the sum of the three remaining crossings by four. This is the initial Quiet Zone Risk Index and accounts for the risk reduction caused by closing C Street.

Grade Separation: Grade separated crossings that were in existence before the creation of a quiet zone are not included in any of the calculations. However, any public crossings within the quiet zone that are proposed to be treated by grade separation should be treated in the same manner as crossing closures. Highway traffic that may be diverted from other crossings within the quiet zone to the new grade separated crossing should be considered when computing the Quiet Zone Risk Index.

Example: A proposed New Quiet Zone contains four crossings: A, B, C and D streets. All streets are equipped with flashing lights and gates. C Street is a busy crossing with a traffic count of 25,000 vehicles per day. It is decided that C Street will be grade separated as part of the project and the existing at-grade crossing closed. Compute the risk indices for all four streets. Calculate the Crossing Corridor Risk Index, which will also be the Risk Index with Horns, by averaging the risk indices for all four of the crossings. To calculate the Quiet Zone Risk Index, first re-calculate the risk indices for B and D streets by decreasing the traffic count for each crossing by 1,200. (The public authority decided that 2,400 motorists will decide to use the grade separation at C Street in order to avoid possible delays caused by passing trains.) Increase the risk indices for A, B and D streets by 66.8% and divide the sum of the three remaining crossings by four. This is the initial Quiet Zone Risk Index and accounts for the risk reduction caused by the grade separation at C Street.

Pre-Existing SSMs: Risk reduction credit may be taken by a public authority for a SSM that was previously implemented and is currently in place in the quiet zone. If an existing improvement meets the criteria for a SSM as provided in appendix A, the improvement is deemed a Pre-Existing SSM. Risk reduction credit is obtained by inflating the Risk Index With Horns to show what the risk would have been at the crossing if the pre-existing SSM had not been implemented. Crossing closures and grade separations that occurred prior to the implementation of the

quiet zone are not Pre-Existing SSMs and do not receive any risk reduction credit.

Example 1. A proposed New Quiet Zone has one crossing that is equipped with flashing lights and gates and has medians 100 feet in length on both sides of the crossing. The medians conform to the requirements in appendix A and qualify as a Pre-Existing SSM. The risk index as calculated for the crossing is 10,000. To calculate the Risk Index With Horns for this crossing, you divide the risk index by difference between one and the effectiveness rate of the pre-existing SSM ($10,000 \div (1 - 0.75) = 40,000$). This value (40,000) would then be averaged in with the risk indices of the other crossings to determine the proposed quiet zone's Risk Index With Horns. To calculate the Quiet Zone Risk Index, the original risk index is increased by 66.8% to account for the additional risk attributed to the absence of the train horn ($10,000 \times 1.668 = 16,680$). This value (16,680) is then averaged into the risk indices of the other crossings that have also been increased by 66.8%. The resulting average is the Quiet Zone Risk Index.

Example 2. A Pre-Rule Quiet Zone consisting of four crossings has one crossing that is equipped with flashing lights and gates and has medians 100 feet in length on both sides of the crossing. The medians conform to the requirements in appendix A and qualify as a Pre-Existing SSM. The risk index as calculated for the crossing is 20,000. To calculate the Risk Index With Horns for this crossing, first reduce the risk index by 40 percent to reflect the risk reduction that would be achieved if train horns were routinely sounded ($20,000 \times 0.6 = 12,000$). Next, divide the resulting risk index by difference between one and the effectiveness rate of the pre-existing SSM ($12,000 \div (1 - 0.75) = 48,000$). This value (48,000) would then be averaged with the adjusted risk indices of the other crossings to determine the pre-rule quiet zone's Risk Index With Horns. To calculate the Quiet Zone Risk Index, the original risk index (20,000) is then averaged into the risk original indices of the other crossings. The resulting average is the Quiet Zone Risk Index.

Pre-Existing Modified SSMs: Risk reduction credit may be taken by a public authority for a modified SSM that was previously implemented and is currently in place in the quiet zone. Modified SSMs are Alternative Safety Measures which must be approved by FRA. If an existing improvement is approved by FRA as a modified SSM as provided in appendix B, the improvement is deemed a Pre-Existing Modified SSM. Risk reduction credit is obtained by inflating the Risk Index With Horns to show what the risk would have been at the crossing if the pre-existing

SSM had not been implemented. The effectiveness rate of the modified SSM will be determined by FRA. The public authority may provide information to FRA to be used in determining the effectiveness rate of the modified SSM. Once an effectiveness rate has been determined, follow the procedure previously discussed for Pre-Existing SSMs to determine the risk values that will be used in the quiet zone calculations.

Wayside Horns: Crossings with wayside horn installations will be treated as a one for one substitute for the train horn and are not to be included when calculating the Crossing Corridor Risk Index, the Risk Index with Horns or the Quiet Zone Risk Index.

Example: A proposed New Quiet Zone contains four crossings: A, B, C and D streets. All streets are equipped with flashing lights and gates. It is decided that C Street will have a wayside horn installed. Compute the risk indices for A, B and D streets. Since C Street is being treated with a wayside horn, it is not included in the calculation of risk. Calculate the Crossing Corridor Risk Index by averaging the risk indices for A, B and D streets. This value is also the Risk Index with Horns. Increase the risk indices for A, B and D streets by 66.8% and average the results. This is the initial Quiet Zone Risk Index for the proposed quiet zone.

C. Partial Quiet Zones

A Partial Quiet Zone is a quiet zone in which locomotive horns are not routinely sounded at public crossings for a specified period of time each day. For example, a quiet zone during only the nighttime hours would be a partial quiet zone. Partial quiet zones may be either New or Pre-Rule and follow the same rules as 24 hour quiet zones. New Partial Quiet Zones must be in effect during the hours of 10 p.m. to 7 a.m. All New Partial Quiet Zones must comply with all of the requirements for New Quiet Zones. For example, all public grade crossings that are open during the time that horns are silenced must be equipped with flashing lights and gates that are equipped with constant warning time (where practical) and power out indicators. Risk is calculated in exactly the same manner as for New Quiet Zones. The Quiet Zone Risk Index is calculated for the entire 24-hour period, even though the train horn will only be silenced during the hours of 10 p.m. to 7 a.m.

A Pre-Rule Partial Quiet Zone is a partial quiet zone at which train horns were not sounding as of October 9, 1996 and on December 18, 2003. All of the regulations that pertain to Pre-Rule Quiet Zones also pertain to Pre-Rule Partial Quiet Zones. The Quiet Zone Risk Index is calculated for the entire 24-hour period for Pre-Rule Partial Quiet Zones, even though train horns are only silenced during the nighttime hours. Pre-Rule

Partial Quiet Zones may qualify for automatic approval in the same manner as Pre-Rule Quiet Zones with one exception. If the Quiet Zone Risk Index is less than twice the National Significant Risk Threshold, and there have been no relevant collisions during the time period when train horns are silenced, then the Pre-Rule Partial Quiet Zone is automatically qualified. In other words, a relevant collision that occurred during the period of time that train horns were sounded will not disqualify a Pre-Rule Partial Quiet Zone that has a Quiet Zone Risk Index that is less than twice the National Significant Risk Index. Pre-Rule Partial Quiet Zones must provide the notification as required in §222.43 in order to keep train horns silenced. A Pre-Rule Partial Quiet Zone may be converted to a 24 hour New Quiet Zone by complying with all of the New Quiet Zone regulations.

D. Intermediate Quiet Zones

An Intermediate Quiet Zone is one where horn restrictions were in place after October 9, 1996, but as of December 18, 2003 (the publication date of the Interim Final Rule). Intermediate Quiet Zones and Intermediate Partial Quiet Zones will be able to keep train horns silenced until June 24, 2006, provided notification is made per §222.43. This will enable public authority to have additional time to make the improvement necessary to come into compliance with the rule. Intermediate Quiet Zones must conform to all the requirements for New Quiet Zones by June 24, 2006. Other than having the horn silenced for an additional year, Intermediate Quiet Zones are treated exactly like New Quiet Zones.

SECTION II—NEW QUIET ZONES

FRA has established several approaches that may be taken in order to establish a New Quiet Zone under this rule. Please see the preceding discussions on “Qualifying Conditions” and “Risk Reduction Methods” to assist in the decision-making process on which approach to take. This following discussion provides the steps necessary to establish New Quiet Zones and includes both the Public Authority Designation and Public Authority Application to FRA methods. It must be remembered that in a New Quiet Zone all public crossings must be equipped with flashing lights and gates. The requirements are the same regardless of whether a 24-hour or partial quiet zone is being created.

A. Requirements for Both Public Authority Designation and Public Authority Application

The following steps are necessary when establishing a New Quiet Zone. This information pertains to both the Public Authority Designation and Public Authority Application to FRA methods.

1. The public authority must provide a written Notice of Intent (§222.43(a)(1) and §222.43(b)) to the railroads that operate over the proposed quiet zone, the State agency responsible for highway and road safety and the State agency responsible for grade crossing safety. The purpose of this Notice of Intent is to provide an opportunity for the railroads and the State agencies to provide comments and recommendations to the public authority as it is planning the quiet zone. They will have 60 days to provide these comments to the public authority. The quiet zone cannot be created unless the Notice of Intent has been provided. FRA encourages public authorities to provide the required Notice of Intent early in the quiet zone development process. The railroads and State agencies can provide an expertise that very well may not be present within the public authority. FRA believes that it will be very useful to include these organizations in the planning process. For example, including railroads and State agencies in the inspections of the crossing will help ensure accurate Inventory information for the crossings. The railroad can provide information on whether the flashing lights and gates are equipped with constant warning time and power out indicators. Pedestrian crossings and private crossings with public access, industrial or commercial use that are within the quiet zone must have a diagnostic team review and be treated according to the team's recommendations. Railroads and the State agency responsible for grade crossing safety must be invited to the diagnostic team review. Note: Please see Section IV for details on the requirements of a Notice of Intent.

2. Determine all public, private and pedestrian at-grade crossings that will be included within the quiet zone. Also, determine any existing grade-separated crossings that fall within the quiet zone. Each crossing must be identified by the U.S. DOT Crossing Inventory number and street or highway name. If a crossing does not have a U.S. DOT Crossing Inventory number, then contact FRA's Office of Safety (202-493-6299) for assistance.

3. Ensure that the quiet zone will be at least one-half mile in length. (§222.35(a)(1)) If more than one New Quiet Zone or New Partial Quiet Zone will be created within a single political jurisdiction, ensure that each New Quiet Zone or New Partial Quiet Zone will be separated by at least one public highway-rail grade crossing. (§222.35(a)(1)(iii))

4. A complete and accurate Grade Crossing Inventory Form must be on file with FRA for all crossings (public, private and pedestrian) within the quiet zone. An inspection of each crossing in the proposed quiet zone should be performed and the Grade Crossing Inventory Forms updated, as necessary, to reflect the current conditions at each crossing.

5. Every public crossing within the quiet zone must be equipped with active warning devices comprising both flashing lights and gates. The warning devices must be equipped with power out indicators. Constant warning time circuitry is also required unless existing conditions would prevent the proper operation of the constant warning time circuitry. FRA recommends that these automatic warning devices also be equipped with at least one bell to provide an audible warning to pedestrians. If the warning devices are already equipped with a bell (or bells), the bells may not be removed or deactivated. The plans for the quiet zone may be made assuming that flashing lights and gates are at all public crossings; however the quiet zone may not be implemented until all public crossings are actually equipped with the flashing lights and gates. (§§222.35(b)(1) and 222.35(b)(2))

6. Private crossings must have cross-bucks and "STOP" signs on both approaches to the crossing. Private crossings with public access, industrial or commercial use must have a diagnostic team review and be treated according to the team's recommendations. The public authority must invite the State agency responsible for grade crossing safety and all affected railroads to participate in the diagnostic review. (§§222.25(b) and (c))

7. Each highway approach to every public and private crossing must have an advance warning sign (in accordance with the MUTCD) that advises motorists that train horns are not sounded at the crossing, unless the public or private crossing is equipped with a wayside horn. (§222.35(c))

8. Each pedestrian crossing must be reviewed by a diagnostic team and equipped or treated in accordance with the recommendation of the diagnostic team. The public authority must invite the State agency responsible for grade crossing safety and all affected railroads to participate in the diagnostic review. At a minimum, each approach to every pedestrian crossing must be equipped with a sign that conforms to the MUTCD and advises pedestrians that train horns are not sounded at the crossing. (§222.27)

B. New Quiet Zones—Public Authority Designation

Once again it should be remembered that all public crossings must be equipped with automatic warning devices consisting of flashing lights and gates in accordance with §222.35(b). In addition, one of the following conditions must be met in order for a public authority to designate a new quiet zone without FRA approval:

- a. One or more SSMs as identified in appendix A are installed at *each* public crossing in the quiet zone (§222.39(a)(1)); or
- b. The Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk

Threshold without SSMs installed at any crossings in the quiet zone (§222.39(a)(2)(i)); or

c. SSMs are installed at selected crossings, resulting in the Quiet Zone Risk Index being reduced to a level equal to, or less than, the Nationwide Significant Risk Threshold (§222.39(a)(2)(ii)); or

d. SSMs are installed at selected crossings, resulting in the Quiet Zone Risk Index being reduced to a level of risk that would exist if the horn were sounded at every crossing in the quiet zone (i.e., the Risk Index with Horns) (§222.39(a)(3)).

Steps necessary to establish a New Quiet Zone using the Public Authority Application to FRA method:

1. If one or more SSMs as identified in appendix A are installed at each public crossing in the quiet zone, the requirements for a public authority designation quiet zone will have been met. It is not necessary for the same SSM to be used at each crossing. However, before any improvements are implemented, the public authority must provide a Notice of Intent, which will trigger a 60-day comment period. During the 60-day comment period, railroads operating within the proposed quiet zone and State agencies responsible for grade crossing, highway and road safety may submit comments on the proposed quiet zone improvements to the public authority. Once the necessary improvements have been installed, Notice of Quiet Zone Establishment shall be provided and the quiet zone implemented in accordance with the rule. If SSMs are not installed at each public crossing, proceed on to Step 2 and use the risk reduction method.

2. To begin, calculate the risk index for each public crossing within the quiet zone (See appendix D. FRA's web-based Quiet Zone Calculator may be used to do this calculation). If flashing lights and gates have to be installed at any public crossings, calculate the risk indices for such crossings as if lights and gates were installed. (NOTE: Flashing lights and gates must be installed prior to initiation of the quiet zone.) If the Inventory record does not reflect the actual conditions at the crossing, be sure to use the conditions that currently exist when calculating the risk index. Note: Private crossings and pedestrian crossings are not included when computing the risk for the proposed quiet zone.

3. The Crossing Corridor Risk Index is then calculated by averaging the risk index for each public crossing within the proposed quiet zone. Since train horns are routinely being sounded for crossings in the proposed quiet zone, this value is also the Risk Index with Horns.

4. In order to calculate the initial Quiet Zone Risk Index, first adjust the risk index at each public crossing to account for the increased risk due to the absence of the train

horn. The absence of the horn is reflected by an increased risk index of 66.8% at gated crossings. The initial Quiet Zone Risk Index is then calculated by averaging the increased risk index for each public crossing within the proposed quiet zone. At this point the Quiet Zone Risk Index will equal the Risk Index with Horns multiplied by 1.668.

5. Compare the Quiet Zone Risk Index to the Nationwide Significant Risk Threshold. If the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold, then the public authority may decide to designate a quiet zone and provide the Notice of Intent, followed by the Notice of Quiet Zone Establishment. With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone rises above the Nationwide Significant Risk Threshold, FRA will notify the Public Authority so that appropriate measures can be taken. (See §222.51(a)).

6. If the Quiet Zone Risk Index is greater than the Nationwide Significant Risk Threshold, then select an appropriate SSM for a crossing. Reduce the inflated risk index calculated in Step 4 for that crossing by the effectiveness rate of the chosen SSM. (See appendix A for the effectiveness rates for the various SSMs). Recalculate the Quiet Zone Risk Index by averaging the revised inflated risk index with the inflated risk indices for the other public crossings. If this new Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold, the quiet zone would qualify for public authority designation. If the Quiet Zone Risk Index is still higher than the Nationwide Significant Risk Threshold, treat another public crossing with an appropriate SSM and repeat the process until the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold. Once this result is obtained, the quiet zone will qualify for establishment by public authority designation. Early in the quiet zone development process, a Notice of Intent should be provided by the public authority, which will trigger a 60-day comment period. During this 60-day comment period, railroads operating within the proposed quiet zone and State agencies responsible for grade crossing, highway and road safety may provide comments on the proposed quiet zone improvements described in the Notice of Intent. Once all the necessary safety improvements have been implemented, Notice of Quiet Zone Establishment must be provided. With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone rises above the Nationwide Significant Risk Threshold, FRA

will notify the public authority so that appropriate measures can be taken. (See § 222.51(a)).

7. If the public authority wishes to reduce the risk of the quiet zone to the level of risk that would exist if the horn were sounded at every crossing within the quiet zone, the public authority should calculate the initial Quiet Zone Risk Index as in Step 4. The objective is to now reduce the Quiet Zone Risk Index to the level of the Risk Index with Horns by adding SSMs at the crossings. The difference between the Quiet Zone Risk Index and the Risk Index with Horns is the amount of risk that will have to be reduced in order to fully compensate for lack of the train horn. The use of the Quiet Zone Calculator will aid in determining which SSMs may be used to reduce the risk sufficiently. Follow the procedure stated in Step 6, except that the Quiet Zone Risk Index must be equal to, or less than, the Risk Index with Horns instead of the Nationwide Significant Risk Threshold. Once this risk level is attained, the quiet zone will qualify for establishment by public authority designation. Early in the quiet zone development process, a Notice of Intent should be provided by the public authority, which will trigger a 60-day comment period. During this 60-day comment period, railroads operating within the proposed quiet zone and State agencies responsible for grade crossing, highway and road safety may provide comments on the proposed quiet zone improvements described in the Notice of Intent. Once all the necessary safety improvements have been implemented, Notice of Quiet Zone Establishment must be provided. One important distinction with this option is that the public authority will never need to be concerned with the Nationwide Significant Risk Threshold or the Quiet Zone Risk Index. The rule's intent is to make the quiet zone as safe as if the train horns were sounding. If this is accomplished, the public authority may designate the crossings as a quiet zone and need not be concerned with possible fluctuations in the Nationwide Significant Risk Threshold or annual risk reviews.

C. New Quiet Zones—Public Authority Application to FRA

A public authority must apply to FRA for approval of a quiet zone under three conditions. First, if any of the SSMs selected for the quiet zone do not fully conform to the design standards set forth in appendix A. These are referred to as modified SSMs in appendix B. Second, when programmed law enforcement, public education and awareness programs, or photo enforcement is used to reduce risk in the quiet zone, these are referred to as non-engineering ASMs in appendix B. It should be remembered that non-engineering ASMs will require periodic moni-

toring as long as the quiet zone is in existence. Third, when engineering ASMs are used to reduce risk. Please see appendix B for detailed explanations of ASMs and the periodic monitoring of non-engineering ASMs.

The public authority is strongly encouraged to submit the application to FRA for review and comment before the appendix B treatments are initiated. This will enable FRA to provide comments on the proposed ASMs to help guide the application process. If non-engineering ASMs or engineering ASMs are proposed, the public authority also may wish to confirm with FRA that the methodology it plans to use to determine the effectiveness rates of the proposed ASMs is appropriate. A quiet zone that utilizes a combination of SSMs from appendix A and ASMs from appendix B must make a Public Authority Application to FRA. A complete and thoroughly documented application will help to expedite the approval process.

The following discussion is meant to provide guidance on the steps necessary to establish a new quiet zone using the Public Authority Application to FRA method. Once again it should be remembered that all public crossings must be equipped with automatic warning devices consisting of flashing lights and gates in accordance with § 222.35(b).

1. Gather the information previously mentioned in the section on "Requirements for both Public Authority Designation and Public Authority Application."

2. Calculate the risk index for each public crossing as directed in Step 2—Public Authority Designation.

3. Calculate the Crossing Corridor Risk Index, which is also the Risk Index with Horns, as directed in Step 3—Public Authority Designation.

4. Calculate the initial Quiet Zone Risk Index as directed in Step 4—Public Authority Designation.

5. Begin to reduce the Quiet Zone Risk Index through the use of ASMs and SSMs. Follow the procedure provided in Step 6—Public Authority Designation until the Quiet Zone Risk Index has been reduced to equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns. (Remember that the public authority may choose which level of risk reduction is the most appropriate for its community.) Effectiveness rates for ASMs should be provided as follows:

- a. Modified SSMs—Estimates of effectiveness for modified SSMs may be based upon adjustments from the effectiveness rates provided in appendix A or from actual field data derived from the crossing sites. The application must provide an estimated effectiveness rate and the rationale for the estimate.

b. Non-engineering ASMs—Effectiveness rates are to be calculated in accordance with the provisions of appendix B, paragraph II B.

c. Engineering ASMs—Effectiveness rates are to be calculated in accordance with the provisions of appendix B, paragraph III B.

6. Once it has been determined through analysis that the Quiet Zone Risk Index will be reduced to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns, the public authority must provide a Notice of Intent. The mailing of the Notice of Intent will trigger a 60-day comment period, during which railroads operating within the proposed quiet zone and State agencies responsible for grade crossing, highway and road safety may provide comments on the proposed quiet zone improvements. After reviewing any comments received, the public authority may make application to FRA for a quiet zone under §222.39(b). FRA will review the application to determine the appropriateness of the proposed effectiveness rates, and whether or not the proposed application demonstrates that the quiet zone meets the requirements of the rule. When submitting the application to FRA for approval, the application must contain the following (§222.39(b)(1)):

a. Sufficient detail concerning the present safety measures at all crossings within the proposed quiet zone. This includes current and accurate crossing inventory forms for each public, private, and pedestrian grade crossing.

b. Detailed information on the safety improvements that are proposed to be implemented at public, private and pedestrian grade crossings within the proposed quiet zone.

c. Membership and recommendations of the diagnostic team (if any) that reviewed the proposed quiet zone.

d. Statement of efforts taken to address comments submitted by affected railroads, the State agency responsible for grade crossing safety, and the State agency responsible for highway and road safety, including a list of any objections raised by the railroads or State agencies.

e. A commitment to implement the proposed safety measures.

f. Demonstrate through data and analysis that the proposed measures will reduce the Quiet Zone Risk Index to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns.

g. A copy of the application must be provided to: All railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone; the landowner having control over any private crossings

within the quiet zone; the State agency responsible for highway and road safety; the State agency responsible for grade crossing safety; and the Associate Administrator. (§222.39(b)(3))

7. Upon receiving written approval from FRA of the quiet zone application, the public authority may then provide the Notice of Quiet Zone Establishment and implement the quiet zone. If the quiet zone is qualified by reducing the Quiet Zone Risk Index to a level at, or below, the Nationwide Significant Risk Threshold, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone rises above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken. (See §222.51(a))

NOTE: The provisions stated above for crossing closures, grade separations, wayside horns, pre-existing SSMs and pre-existing modified SSMs apply for Public Authority Application to FRA as well.

SECTION III—PRE-RULE QUIET ZONES

Pre-Rule Quiet Zones are treated slightly differently from New Quiet Zones in the rule. This is a reflection of the statutory requirement to “take into account the interest of communities that have in effect restrictions on the sounding of a locomotive horn at highway-rail grade crossings. * * *” (49 U.S.C. 20153(i)) It also recognizes the historical experience of train horns not being sounded at Pre-Rule Quiet Zones.

Overview

Pre-Rule Quiet Zones that are not established by automatic approval (see discussion that follows) must meet the same requirements as New Quiet Zones as provided in §222.39. In other words, risk must be reduced through the use of SSMs or ASMs so that the Quiet Zone Risk Index for the quiet zone has been reduced to either the risk level which would exist if locomotive horns sounded at all crossings in the quiet zone (*i.e.* the Risk Index with Horns) or to a risk level equal to, or less than, the Nationwide Significant Risk Threshold. There are four differences in the requirements between Pre-Rule Quiet Zones and New Quiet Zones that must be noted.

(1) First, since train horns have not been routinely sounded in the Pre-Rule Quiet Zone, it is not necessary to increase the risk indices of the public crossings to reflect the additional risk caused by the lack of a train horn. Since the train horn has already been silenced, the added risk caused by the lack of a horn is reflected in the actual collision history at the crossings. Collision history is an important part in the calculation of the severity risk indices. In other words, the Quiet Zone Risk Index is calculated by averaging

the existing risk index for each public crossing without the need to increase the risk index by 66.8%. For Pre-Rule Quiet Zones, the Crossing Corridor Risk Index and the initial Quiet Zone Risk Index have the same value.

(2) Second, since train horns have been silenced at the crossings, it will be necessary to mathematically determine what the risk level would have been at the crossings if train horns had been routinely sounded. These revised risk levels then will be used to calculate the Risk Index with Horns. This calculation is necessary to determine how much risk must be eliminated in order to compensate for the lack of the train horn. This will allow the public authority to have the choice to reduce the risk to at least the level of the Nationwide Significant Risk Threshold or to fully compensate for the lack of the train horn.

To calculate the Risk Index with Horns, the first step is to divide the existing severity risk index for each crossing by the appropriate value as shown in Table 1. This process eliminates the risk that was caused by the absence of train horns. The table takes into account that the train horn has been found to produce different levels of effectiveness in preventing collisions depending on the type of warning device at the crossing. (Note: FRA's web-based Quiet Zone Calculator will perform this computation automatically for Pre-Rule Quiet Zones.) The Risk Index with Horns is the average of the revised risk indices. The difference between the calculated Risk Index with Horns and the Quiet Zone Risk Index is the amount of risk that would have to be reduced in order to fully compensate for the lack of train horns.

TABLE 1—RISK INDEX DIVISOR VALUES

	Passive	Flashing lights	Lights & gates
U.S.	1.749	1.309	1.668

(3) The third difference is that credit is given for the risk reduction that is brought about through the upgrading of the warning devices at public crossings (§222.35(b)(3)). For New Quiet Zones, all crossings must be equipped with automatic warning devices consisting of flashing lights and gates. Crossings without gates must have gates installed. The severity risk index for that crossing is then calculated to establish the risk index that is used in the Risk Index with Horns. The Risk Index with Horns is then increased by 66.8% to adjust for the lack of the train horn. The adjusted figure is the initial Quiet Zone Risk Index. There is no credit received for the risk reduction that is attributable to warning device upgrades in New Quiet Zones.

For Pre-Rule Quiet Zones, the Risk Index with Horns is calculated from the initial risk indices which use the warning devices that are currently installed. If a public authority elects to upgrade an existing warning device as part of its quiet zone plan, the accident prediction value for that crossing will be recalculated based on the upgraded warning device. (Once again, FRA's web-based Quiet Zone Calculator can do the actual computation.) The new accident prediction value is then used in the severity risk index formula to determine the risk index for the crossing. This adjusted risk index is then used to compute the new Quiet Zone Risk Index. This computation allows the risk reduction attributed to the warning device upgrades to be used in establishing a quiet zone.

(4) The fourth difference is that Pre-Rule Quiet Zones have different minimum requirements under §222.35. A Pre-Rule Quiet Zone may be less than one-half mile in length if that was its length as of October 9, 1996 (§222.35(a)(2)). A Pre-Rule Quiet Zone does not have to have automatic warning devices consisting of flashing lights and gates at every public crossing (§222.35(b)(3)). The existing crossing safety warning systems in place as of December 18, 2003 may be retained but cannot be downgraded. It also is not necessary for the automatic warning devices to be equipped with constant warning time devices or power out indicators; however, when the warning devices are upgraded, constant warning time and power out indicators will be required if reasonably practical (§222.35(b)(3)). Advance warning signs that notify the motorist that train horns are not sounded do not have to be installed on each approach to public, private, and pedestrian grade crossings within the quiet zone until June 24, 2008. (§§222.27(d) and 222.35(c)) Similarly, STOP signs and crossbucks do not have to be installed on each approach to private crossings within the quiet zone until June 24, 2008. (§222.25(c)).

A. Requirements for Both Public Authority Designation and Public Authority Application—Pre-Rule Quiet Zones

The following is necessary when establishing a Pre-Rule Quiet Zone. This information pertains to Automatic Approval, the Public Authority Designation and Public Authority Application to FRA methods.

1. Determine all public, private and pedestrian at-grade crossings that will be included within the quiet zone. Also determine any existing grade separated crossings that fall within the quiet zone. Each crossing must be identified by the U.S. DOT Crossing Inventory number and street name. If a crossing does not have a U.S. DOT crossing number, then contact FRA for assistance.

2. Document the length of the quiet zone. It is not necessary that the quiet zone be at least one-half mile in length. Pre-Rule Quiet

Zones may be shorter than one-half mile. However, the addition of a new crossing that is not a part of an existing Pre-Rule Quiet Zone to a quiet zone nullifies its pre-rule status, and the resulting New Quiet Zone must be at least one-half mile. The deletion of a crossing from a Pre-Rule Quiet Zone (except through closure or grade separation) must result in a quiet zone that is at least one-half mile in length. It is the intent of the rule to allow adjacent Pre-Rule Quiet Zones to be combined into one large pre-rule quiet zone if the respective public authorities desire to do so. (§222.35(a)(2))

3. A complete and accurate Grade Crossing Inventory Form must be on file with FRA for all crossings (public, private and pedestrian) within the quiet zone. An inspection of each crossing in the proposed quiet zone should be performed and the Grade Crossing Inventory Forms updated, as necessary, to reflect the current conditions at each crossing.

4. Pre-Rule Quiet Zones must retain, and may upgrade, the existing grade crossing safety warning systems. Unlike New Quiet Zones, it is not necessary that every public crossing within a Pre-Rule Quiet Zone be equipped with active warning devices comprising both flashing lights and gates. Existing warning devices need not be equipped with power out indicators and constant warning time circuitry. If warning devices are upgraded to flashing lights, or flashing lights and gates, the upgraded equipment must include, as is required for New Quiet Zones, power out indicators and constant warning time devices (if reasonably practical). (§222.35(b)(3))

5. By June 24, 2008, private crossings must have cross-bucks and "STOP" signs on both approaches to the crossing. (§222.25(c))

6. By June 24, 2008, each approach to a public, private, and pedestrian crossing must be equipped with an advance warning sign that conforms to the MUTCD and advises pedestrians and motorists that train horns are not sounded at the crossing. (§§222.27(d), 222.35(c))

7. It will be necessary for the public authority to provide a Notice of Quiet Zone Continuation in order to prevent the resumption of locomotive horn sounding when the rule becomes effective. A detailed discussion of the requirements of §222.43(c) is provided in Section IV of this appendix. The Notice of Quiet Zone Continuation must be provided to the appropriate parties by all Pre-Rule Quiet Zones that have not established quiet zones by automatic approval. This should be done no later than June 3, 2005 to ensure that train horns will not start being sounded on June 24, 2005. A Pre-Rule Quiet Zone may provide a Notice of Quiet Zone Continuation before it has determined whether or not it qualifies for automatic approval. Once it has been determined that the Pre-Rule Quiet

Zone will be established by automatic approval, the Public Authority must provide the Notice of Quiet Zone Establishment. This must be accomplished no later than December 24, 2005. If the Pre-Rule Quiet Zone will not be established by automatic approval, the Notice of Quiet Zone Continuation will enable the train horns to be silenced until June 24, 2008. (Please refer to §222.41(c) for more information.)

B. Pre-Rule Quiet Zones—Automatic Approval

In order for a Pre-Rule Quiet Zone to be established under this rule (§222.41(a)), one of the following conditions must be met:

a. One or more SSMS as identified in appendix A are installed at *each* public crossing in the quiet zone;

b. The Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold;

c. The Quiet Zone Risk Index is above the Nationwide Significant Risk Threshold but less than twice the Nationwide Significant Risk Threshold and there have been no relevant collisions at any public grade crossing within the quiet zone for the preceding five years; or

d. The Quiet Zone Risk Index is equal to, or less than, the Risk Index With Horns.

Additionally, the Pre-Rule Quiet Zone must be in compliance with the minimum requirements for quiet zones (§222.35) and the notification requirements in §222.43.

The following discussion is meant to provide guidance on the steps necessary to determine if a Pre-Rule Quiet Zone qualifies for automatic approval.

1. All of the items listed in *Requirements for Both Public Authority Designation and Public Authority Application—Pre-Rule Quiet Zones* previously mentioned are to be accomplished. Remember that a Pre-Rule Quiet Zone may be less than one-half mile in length if that was its length as of October 9, 1996. Also, a Pre-Rule Quiet Zone does not have to have automatic warning devices consisting of flashing lights and gates at every public crossing.

2. If one or more SSMS as identified in appendix A are installed at each public crossing in the quiet zone, the quiet zone qualifies and the public authority may provide the Notice of Quiet Zone Establishment. If the Pre-Rule Quiet Zone does not qualify by this step, proceed on to the next step.

3. Calculate the risk index for each public crossing within the quiet zone (See appendix D.) Be sure that the risk index is calculated using the formula appropriate for the type of warning device that is actually installed at the crossing. Unlike New Quiet Zones, it is not necessary to calculate the risk index using flashing lights and gates as the warning device at every public crossing. (FRA's web-based Quiet Zone Calculator may be used to simplify the calculation process). If

the Inventory record does not reflect the actual conditions at the crossing, be sure to use the conditions that currently exist when calculating the risk index.

4. The Quiet Zone Risk Index is then calculated by averaging the risk index for each public crossing within the proposed quiet zone. (Note: The initial Quiet Zone Risk Index and the Crossing Corridor Risk Index are the same for Pre-Rule Quiet Zones.)

5. Compare the Quiet Zone Risk Index to the Nationwide Significant Risk Threshold. If the Quiet Zone Risk Index is equal to, or less than, the Nationwide Significant Risk Threshold, then the quiet zone qualifies, and the public authority may provide the Notice of Quiet Zone Establishment. With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk. If the Quiet Zone Risk Index for the quiet zone is found to be above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken (See § 222.51(b)). If the Pre-Rule Quiet Zone is not established by this step, proceed on to the next step.

6. If the Quiet Zone Risk Index is above the Nationwide Significant Risk Threshold but less than twice the Nationwide Significant Risk Threshold and there have been no relevant collisions at any public grade crossing within the quiet zone for the preceding five years, then the quiet zone qualifies for automatic approval. However, in order to qualify on this basis, the public authority must provide a Notice of Quiet Zone Establishment by December 24, 2005. (Note: A relevant collision means a collision at a highway-rail grade crossing between a train and a motor vehicle, excluding the following: a collision resulting from an activation failure of an active grade crossing warning system; a collision in which there is no driver in the motor vehicle; or a collision where the highway vehicle struck the side of the train beyond the fourth locomotive unit or rail car.) With this approach, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk. If the Quiet Zone Risk Index for the quiet zone is above two times the Nationwide Significant Risk Threshold, or a relevant collision has occurred during the preceding year, FRA will notify the public authority so that appropriate measures can be taken (See § 222.51(b)).

If the Pre-Rule Quiet Zone is not established by automatic approval, continuation of the quiet zone may require implementation of SSMs or ASMs to reduce the Quiet Zone Risk Index for the quiet zone to a risk level equal to, or below, either the risk level which would exist if locomotive horns sounded at all crossings in the quiet zone (*i.e.* the Risk Index with Horns) or the Nationwide Significant Risk Threshold. This is the same methodology used to create New Quiet Zones

with the exception of the four differences previously noted. A review of the previous discussion on the two methods used to establish quiet zones may prove helpful in determining which would be the most beneficial to use for a particular Pre-Rule Quiet Zone.

C. Pre-Rule Quiet Zones—Public Authority Designation

The following discussion is meant to provide guidance on the steps necessary to establish a Pre-Rule Quiet Zone using the Public Authority Designation method.

1. The public authority must provide a Notice of Intent (§§ 222.43(a)(1) and 222.43(b)) to the railroads that operate within the proposed quiet zone, the State agency responsible for highway and road safety and the State agency responsible for grade crossing safety. This notice must be mailed by February 24, 2008, in order to continue existing locomotive horn restrictions beyond June 24, 2008 without interruption. The purpose of this Notice of Intent is to provide an opportunity for the railroads and the State agencies to provide comments and recommendations to the public authority as it is planning the quiet zone. They will have 60 days to provide these comments to the public authority. The Notice of Intent must be provided, if new SSMs or ASMs will be implemented within the quiet zone. FRA encourages public authorities to provide the required Notice of Intent early in the quiet zone development process. The railroads and State agencies can provide an expertise that very well may not be present within the public authority. FRA believes that it will be very useful to include these organizations in the planning process. For example, including them in the inspections of the crossing will help ensure accurate Inventory information for the crossings. Note: Please see Section IV for details on the requirements of a Notice of Intent.

2. All of the items listed in “Requirements for Both Public Authority Designation and Public Authority Application—Pre-Rule Quiet Zones” previously mentioned are to be accomplished. Remember that a Pre-Rule Quiet Zone may be less than one-half mile in length if that was its length as of October 9, 1996. Also, a Pre-Rule Quiet Zone does not have to have automatic warning devices consisting of flashing lights and gates at every public crossing.

3. Calculate the risk index for each public crossing within the quiet zone as in Step 3—Pre-Rule Quiet Zones—Automatic Approval.

4. The Crossing Corridor Risk Index is then calculated by averaging the risk index for each public crossing within the proposed quiet zone. Since train horns are not being sounded for crossings, this value is actually the initial Quiet Zone Risk Index.

5. Calculate Risk Index with Horns by the following:

a. For each public crossing, divide the risk index that was calculated in Step 2 by the appropriate value in Table 1. This produces the risk index that would have existed had the train horn been sounded.

b. Average these reduced risk indices together. The resulting average is the Risk Index with Horns.

6. Begin to reduce the Quiet Zone Risk Index through the use of SSMs or by upgrading existing warning devices. Follow the procedure provided in Step 6—Public Authority Designation until the Quiet Zone Risk Index has been reduced to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns. A public authority may elect to upgrade an existing warning device as part of its Pre-Rule Quiet Zone plan. When upgrading a warning device, the accident prediction value for that crossing must be re-calculated for the new warning device. Determine the new risk index for the upgraded crossing by using the new accident prediction value in the severity risk index formula. This new risk index is then used to compute the new Quiet Zone Risk Index. (Remember that FRA's web-based Quiet Zone Calculator will be able to do the actual computations.) Once the Quiet Zone Risk Index has been reduced to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns, the quiet zone may be established by the Public Authority Designation method, and the public authority may provide the Notice of Quiet Zone Establishment once all the necessary improvements have been installed. If the quiet zone is established by reducing the Quiet Zone Risk Index to a risk level equal to, or less than, the Nationwide Significant Risk Threshold, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk Index. If the Quiet Zone Risk Index for the quiet zone rises above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken (See § 222.51(b)).

7. If the Pre-Rule Quiet Zone will not be established before June 24, 2008, the public authority must file a detailed plan for quiet zone improvements with the Associate Administrator by June 24, 2008. By providing a Notice of Intent (see Step 1 above) and a detailed plan for quiet zone improvements, existing locomotive horn restrictions may continue until June 24, 2010. (If a comprehensive State-wide implementation plan and funding commitment are also provided and safety improvements are initiated within at least one Pre-Rule Quiet Zone or Pre-Rule Partial Quiet Zone, existing locomotive horn restrictions may continue until June 24, 2013.) (See § 222.41(c) for more information.)

NOTE: The provisions stated above for crossing closures, grade separations, wayside

horns, pre-existing SSMs and pre-existing modified SSMs apply for Public Authority Application to FRA as well.

D. Pre-Rule Quiet Zones—Public Authority Application to FRA

The following discussion is meant to provide guidance on the steps necessary to establish a Pre-Rule Quiet Zone using the Public Authority Application to FRA method.

1. The public authority must provide a Notice of Intent (§§ 222.43(a)(1) and 222.43(b)) to the railroads that operate within the proposed quiet zone, the State agency responsible for highway and road safety and the State agency responsible for grade crossing safety. This notice must be mailed by February 24, 2008, in order to continue existing locomotive horn restrictions beyond June 24, 2008 without interruption. The purpose of this Notice of Intent is to provide an opportunity for the railroads and the State agencies to provide comments and recommendations to the public authority as it is planning the quiet zone. They will have 60 days to provide these comments to the public authority. The Notice of Intent must be provided, if new SSMs or ASMs will be implemented within the quiet zone. FRA encourages public authorities to provide the required Notice of Intent early in the quiet zone development process. The railroads and State agencies can provide an expertise that very well may not be present within the public authority. FRA believes that it will be very useful to include these organizations in the planning process. For example, including them in the inspections of the crossing will help ensure accurate inventory information for the crossings. Note: Please see Section IV for details on the requirements of a Notice of Detailed Plan.

2. All of the items listed in "Requirements for both Public Authority Designation and Public Authority Application—Pre-Rule Quiet Zones" previously mentioned are to be accomplished. Remember that a Pre-Rule Quiet Zone may be less than one-half mile in length if that was its length as of October 9, 1996. Also, a Pre-Rule Quiet Zone does not have to have automatic warning devices consisting of flashing lights and gates at every public crossing.

3. Calculate the risk index for each public crossing within the quiet zone (See appendix D. FRA's web-based Quiet Zone Calculator may be used to simplify the calculation process). If the inventory record does not reflect the actual conditions at the crossing, be sure to use the conditions that currently exist when calculating the risk index.

4. The Crossing Corridor Risk Index is then calculated by averaging the risk index for each public crossing within the proposed quiet zone. Since train horns are not being sounded for crossings, this value is actually the initial Quiet Zone Risk Index.

5. Calculate Risk Index with Horns by the following:

a. For each public crossing, divide its risk index that was calculated in Step 2 by the appropriate value in Table 1. This produces the risk index that would have existed had the train horn been sounded.

b. Average these reduced risk indices together. The resulting average is the Risk Index with Horns.

6. Begin to reduce the Quiet Zone Risk Index through the use of ASMs and/or SSMS. Follow the procedure provided in Step 6—New Quiet Zones Public Authority Designation—until the Quiet Zone Risk Index has been reduced to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns. A public authority may elect to upgrade an existing warning device as part of its Pre-Rule Quiet Zone plan. When upgrading a warning device, the accident prediction value for that crossing must be re-calculated for the new warning device. Determine the new risk index for the upgraded crossing by using the new accident prediction value in the severity risk index formula. (Remember that FRA's web-based quiet zone risk calculator will be able to do the actual computations.) This new risk index is then used to compute the new Quiet Zone Risk Index. Effectiveness rates for ASMs should be provided as follows:

a. Modified SSMS—Estimates of effectiveness for modified SSMS may be based upon adjustments from the benchmark levels provided in appendix A or from actual field data derived from the crossing sites. The application must provide an estimated effectiveness rate and the rationale for the estimate.

b. Non-engineering ASMS—Effectiveness rates are to be calculated in accordance with the provisions of appendix B, section II B.

c. Engineering ASMS—Effectiveness rates are to be calculated in accordance with the provisions of appendix B, section III B.

7. Once it has been determined through analysis that the Quiet Zone Risk Index will be reduced to a level equal to, or less than, either the Nationwide Significant Risk Threshold or the Risk Index with Horns, the public authority may make application to FRA for a quiet zone under §222.39(b). FRA will review the application to determine the appropriateness of the proposed effectiveness rates, and whether or not the proposed application demonstrates that the quiet zone meets the requirements of the rule. When submitting the application to FRA for approval, it should be remembered that the application must contain the following (§222.39(b)(1)):

a. Sufficient detail concerning the present safety measures at all crossings within the proposed quiet zone to enable the Associate Administrator to evaluate their effectiveness. This includes current and accurate

crossing Inventory forms for each public, private and pedestrian grade crossing.

b. Detailed information on the safety improvements, including upgraded warning devices that are proposed to be implemented at public, private, and pedestrian grade crossings within the proposed quiet zone.

c. Membership and recommendations of the diagnostic team (if any) that reviewed the proposed quiet zone.

d. Statement of efforts taken to address comments submitted by affected railroads, the State agency responsible for grade crossing safety, and the State agency responsible for highway and road safety, including a list of any objections raised by the railroads or State agencies.

e. A commitment to implement the proposed safety measures.

f. Demonstrate through data and analysis that the proposed measures will reduce the Quiet Zone Risk Index to a level at, or below, either the Nationwide Significant Risk Threshold or the Risk Index with Horns.

g. A copy of the application must be provided to all railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone; the landowner having control over any private crossings within the quiet zone; the State agency responsible for highway and road safety; the State agency responsible for grade crossing safety; and the Associate Administrator. (§222.39(b)(3))

8. Upon receiving written approval from FRA of the quiet zone application, the public authority may then provide the Notice of Quiet Zone Establishment and implement the quiet zone. If the quiet zone is established by reducing the Quiet Zone Risk Index to a level equal to, or less than, the Nationwide Significant Risk Threshold, FRA will annually recalculate the Nationwide Significant Risk Threshold and the Quiet Zone Risk. If the Quiet Zone Risk Index for the quiet zone is above the Nationwide Significant Risk Threshold, FRA will notify the public authority so that appropriate measures can be taken (See §222.51(b)).

NOTE: The provisions stated above for crossing closures, grade separations, wayside horns, pre-existing SSMS and pre-existing modified SSMS apply for Public Authority Application to FRA as well.

SECTION IV—REQUIRED NOTIFICATIONS

A. Introduction

The public authority is responsible for providing notification to parties that will be affected by the quiet zone. There are several different types of notifications and a public authority may have to make more than one notification during the entire process of

complying with the regulation. The notification process is to ensure that interested parties are made aware in a timely manner of the establishment or continuation of quiet zones. It will also provide an opportunity for State agencies and affected railroads to provide input to the public authority during the development of quiet zones. Specific information is to be provided so that the crossings in the quiet zone can be identified. Providing the appropriate notification is important because once the rule becomes effective, railroads will be obligated to sound train horns when approaching all public crossings unless notified in accordance with the rule that a New Quiet Zone has been established or that a Pre-Rule or Intermediate Quiet Zone is being continued.

B. Notice of Intent—§ 222.43(b)

The purpose of the Notice of Intent is to provide notice to the railroads and State agencies that the public authority is planning on creating a New Quiet Zone or implementing new SSMs or ASMs within a Pre-Rule Quiet Zone. The Notice of Intent provides an opportunity for the railroad and the State agencies to give input to the public authority during the quiet zone development process. The State agencies and railroads will be given sixty days to provide information and comments to the public agency.

The Notice of Intent must be provided under the following circumstances:

1. A New Quiet Zone or New Partial Quiet Zone is under consideration.
2. An Intermediate Quiet Zone or Intermediate Partial Quiet Zone that will be converted into a New Quiet Zone or New Partial Quiet Zone. Please note that Notice of Intent must be mailed by April 3, 2006, in order prevent the resumption of locomotive horn sounding on June 24, 2006.
3. The implementation of SSMs or ASMs within a Pre-Rule Quiet Zone or Pre-Rule Partial Quiet Zone is under consideration. Please note that Notice of Intent must be mailed by February 24, 2008, in order to continue existing restrictions on locomotive horn sounding beyond June 24, 2008 without interruption. Each public authority that is creating a New Quiet Zone must provide written notice, by certified mail, return receipt requested, to the following:

1. All railroads operating within the proposed quiet zone
2. State agency responsible for highway and road safety
3. State agency responsible for grade crossing safety

The Notice of Intent must contain the following information:

1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossings within the proposed quiet zone. The crossings are to be identified by both the U.S. DOT Crossing In-

ventory Number and the street or highway name.

2. A statement of the time period within which the restrictions would be in effect on the routine sounding of train horns (*i.e.*, 24 hours or from 10 p.m. to 7 a.m.).

3. A brief explanation of the public authority's tentative plans for implementing improvements within the proposed quiet zone.

4. The name and title of the person who will act as the point of contact during the quiet zone development process and how that person can be contacted.

5. A list of the names and addresses of each party that will receive a copy of the Notice of Intent.

The parties that receive the Notice of Intent will be able to submit information or comments to the public authority for 60 days. The public authority will not be able to establish the quiet zone during the 60 day comment period unless each railroad and State agency that receives the Notice of Intent provides either written comments to the public authority or a written statement waiving its right to provide comments on the Notice of Intent. The public authority must provide an affirmation in the Notice of Quiet Zone Establishment that each of the required parties was provided the Notice of Intent and the date it was mailed. If the quiet zone is being established within 60 days of the mailing of the Notice of Intent, the public authority also must affirm each of the parties have provided written comments or waived its right to provide comments on the Notice of Intent.

*C. Notice of Quiet Zone Continuation—
§ 222.43(c)*

The purpose of the Notice of Quiet Zone Continuation is to provide a means for the public authority to formally advise affected parties that an existing quiet zone is being continued after the effective date of the rule. All Pre-Rule, Pre-Rule Partial, Intermediate and Intermediate Partial Quiet Zones must provide this Notice of Quiet Zone Continuation no later than June 3, 2005 to ensure that train horns are not sounded at public crossings when the rule becomes effective on June 24, 2005. This will enable railroads to properly comply with the requirements of the Final Rule.

Each public authority that is continuing an existing Pre-Rule, Pre-Rule Partial, Intermediate and Intermediate Partial Quiet Zone must provide written notice, by certified mail, return receipt requested, to the following:

1. All railroads operating over the public highway-rail grade crossings within the quiet zone;
2. The highway or traffic control or law enforcement authority having jurisdiction over

vehicular traffic at grade crossings within the quiet zone;

3. The landowner having control over any private crossings within the quiet zone;

4. The State agency responsible for highway and road safety;

5. The State agency responsible for grade crossing safety; and

6. The Associate Administrator.

The Notice of Quiet Zone Continuation must contain the following information:

1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone, identified by both U.S. DOT National Highway-Rail Grade Crossing Inventory Number and street or highway name.

2. A specific reference to the regulatory provision that provides the basis for quiet zone continuation, citing as appropriate, § 222.41 or 222.42.

3. A statement of the time period within which restrictions on the routine sounding of the locomotive horn will be imposed (i.e., 24 hours or nighttime hours only.)

4. An accurate and complete Grade Crossing Inventory Form for each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone that reflects conditions currently existing at the crossing.

5. The name and title of the person responsible for monitoring compliance with the requirements of this part and the manner in which that person can be contacted.

6. A list of the names and addresses of each party that will receive the Notice of Quiet Zone Continuation.

7. A statement signed by the chief executive officer of each public authority participating in the continuation of the quiet zone, in which the chief executive officer certifies that the information submitted by the public authority is accurate and complete to the best of his/her knowledge and belief.

Public authorities should remember that this notice is required to ensure that train horns will remain silent. Even if a public authority has not been able to determine whether its Pre-Rule or Pre-Rule Partial Quiet Zone qualifies for automatic approval under the rule, it should issue a Notice of Quiet Zone Continuation to keep the train horns silent after the effective date of the rule.

*E. Notice of Quiet Zone Establishment—
§ 222.43(d)*

The purpose of the Notice of Quiet Zone Establishment is to provide a means for the public authority to formally advise affected parties that a quiet zone is being established. Notice of Quiet Zone Establishment must be provided under the following circumstances:

1. A New Quiet Zone or New Partial Quiet Zone is being created.

2. A Pre-Rule Quiet Zone or a Pre-Rule Partial Quiet Zone that qualifies for automatic approval under the rule is being established.

3. An Intermediate Quiet Zone or Intermediate Partial Quiet Zone that is creating a New Quiet Zone under the rule. Please note that Notice of Quiet Zone Establishment must be provided by June 3, 2006, in order to prevent the resumption of locomotive horn sounding on June 24, 2006.

4. A Pre-Rule Quiet Zone or a Pre-Rule Partial Quiet Zone that was not established by automatic approval and has since implemented improvements to establish a quiet zone in accordance to the rule.

Each public authority that is establishing a quiet zone under the above circumstances must provide written notice, by certified mail, return receipt requested, to the following:

1. All railroads operating over the public highway-rail grade crossings within the quiet zone;

2. The highway or traffic control or law enforcement authority having jurisdiction over vehicular traffic at grade crossings within the quiet zone;

3. The landowner having control over any private crossings within the quiet zone;

4. The State agency responsible for highway and road safety;

5. The State agency responsible for grade crossing safety; and

6. The Associate Administrator.

The Notice of Quiet Establishment must contain the following information:

1. A list of each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone, identified by both U.S. DOT National Highway-Rail Grade Crossing Inventory Number and street or highway name.

2. A specific reference to the regulatory provision that provides the basis for quiet zone establishment, citing as appropriate, § 222.39(a)(1), 222.39(a)(2)(i), 222.39(a)(2)(ii), 222.39(a)(3), 222.39(b), 222.41(a)(1)(i), 222.41(a)(1)(ii), 222.41(a)(1)(iii), 222.41(a)(1)(iv), 222.41(b)(1)(i), 222.41(b)(1)(ii), 222.41(b)(1)(iii), or 222.41(b)(1)(iv).

(a) If the Notice of Quiet Establishment contains a specific reference to § 222.39(a)(2)(i), 222.39(a)(2)(ii), 222.39(a)(3), 222.41(a)(1)(ii), 222.41(a)(1)(iii), 222.41(a)(1)(iv), 222.41(b)(1)(ii), 222.41(b)(1)(iii), or 222.41(b)(1)(iv), it shall include a copy of the FRA web page that contains the quiet zone data upon which the public authority is relying.

(b) If the Notice of Quiet Establishment contains a specific reference to § 222.39(b), it shall include a copy of FRA's notification of approval.

3. If a diagnostic team review was required under § 222.25 (private crossings) or § 222.27

(pedestrian crossings), the Notice of Quiet Establishment shall include a statement affirming that the State agency responsible for grade crossing safety and all affected railroads were provided an opportunity to participate in the diagnostic team review. The Notice of Quiet Establishment shall also include a list of recommendations made by the diagnostic team.

4. A statement of the time period within which restrictions on the routine sounding of the locomotive horn will be imposed (i.e., 24 hours or from 10 p.m. until 7 a.m.)

5. An accurate and complete Grade Crossing Inventory Form for each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone that reflects the conditions existing at the crossing before any new SSMs or ASMs were implemented.

6. An accurate, complete and current Grade Crossing Inventory Form for each public highway-rail grade crossing, private highway-rail grade crossing, and pedestrian crossing within the quiet zone that reflects SSMs and ASMs in place upon establishment of the quiet zone. SSMs and ASMs that cannot be fully described on the Inventory Form shall be separately described.

7. If the public authority was required to provide a Notice of Intent:

(a) The Notice of Quiet Zone Establishment shall contain a statement affirming that the Notice of Intent was provided in accordance with the rule. This statement shall also state the date on which the Notice of Intent was mailed.

(b) If the Notice of Quiet Zone Establishment will be mailed less than 60 days after the date on which the Notice of Intent was mailed, the Notice of Quiet Zone Establishment shall also contain a written statement affirming that comments and/or written waiver statements have been received from each railroad operating over public grade crossings within the proposed quiet zone, the State agency responsible for grade crossing safety, and the State agency responsible for highway and road safety.

8. The name and title of the person responsible for monitoring compliance with the requirements of this part and the manner in which that person can be contacted.

9. A list of the names and addresses of each party that is receiving a copy of the Notice of Quiet Establishment.

10. A statement signed by the chief executive officer of each public authority participating in the establishment of the quiet zone, in which the chief executive officer shall certify that the information submitted by the public authority is accurate and complete to the best of his/her knowledge and belief.

SECTION V—EXAMPLES OF QUIET ZONE IMPLEMENTATIONS

Example 1—New Quiet Zone

(a) A public authority wishes to create a New Quiet Zone over four public crossings. All of the crossings are equipped with flashing lights and gates, and the length of the quiet zone is 0.75 mile. There are no private crossings within the proposed zone.

(b) The tables that follow show the street name in the first column, and the existing risk index for each crossing with the horn sounding (“Crossing Risk Index w/ Horns”) in the second. The third column, “Crossing Risk Index w/o Horns”, is the risk index for each crossing after it has been inflated by 66.8% to account for the lack of train horns. The fourth column, “SSM Eff”, is the effectiveness of the SSM at the crossing. A zero indicates that no SSM has been applied. The last column, “Crossing Risk Index w/o Horns Plus SSM”, is the inflated risk index for the crossing after being reduced by the implementation of the SSM. At the bottom of the table are two values. The first is the Risk Index with Horns (“RIWH”) which represents the average initial amount of risk in the proposed quiet zone with the train horn sounding. The second is the Quiet Zone Risk Index (“QZRI”), which is the average risk in the proposed quiet zone taking into consideration the increased risk caused by the lack of train horns and the reductions in risk attributable to the installation of SSMs. For this example it is assumed that the Nationwide Significant Risk Threshold is 17,030. In order for the proposed quiet zone to qualify under the rule, the Quiet Zone Risk Index must be reduced to a level at, or below, the Nationwide Significant Risk Threshold (17,030) or the Risk Index with Horns.

(c) Table 2 shows the existing conditions in the proposed quiet zone. SSMs have not yet been installed. The Risk Index with Horns for the proposed quiet zone is 11,250. The Quiet Zone Risk Index without any SSMs is 18,765.

TABLE 2

Street	Crossing risk index w/horns	Crossing risk index w/o horns	SSM EFF	Crossing risk index w/o horns plus SSM
A	12000	20016	0	20016
B	10000	16680	0	16680
C	8000	13344	0	13344

TABLE 2—Continued

Street	Crossing risk index w/horns	Crossing risk index w/o horns	SSM EFF	Crossing risk index w/o horns plus SSM
D	15000	25020	0	25020
	RIWH			QZRI
	11250			18765

(d) The public authority decides to install traffic channelization devices at D Street. Reducing the risk at the crossing that has the highest severity risk index will provide the greatest reduction in risk. The effectiveness of traffic channelization devices is 0.75. Table 3 shows the changes in the proposed

quiet zone corridor that would occur when traffic channelization devices are installed at D Street. The Quiet Zone Risk Index has been reduced to 14,073.75. This reduction in risk would qualify the quiet zone as the risk has been reduced lower than the Nationwide Significant Risk Threshold which is 17,030.

TABLE 3

Street	Crossing risk index w/horns	Crossing risk index w/o horns	SSM EFF	Crossing risk index w/o horns plus SSM
A	12000	20016	0	20016
B	10000	16680	0	16680
C	8000	13344	0	13344
D	15000	25020	0.75	6255
	RIWH			QZRI
	11250			14073.75

(e) The public authority realizes that reducing the Quiet Zone Risk Index to a level below the Nationwide Significant Risk Threshold will result in an annual recalculation of the Quiet Zone Risk Index and comparison to the Nationwide Significant Risk Threshold. As the Quiet Zone Risk Index is close to the Nationwide Significant Risk Threshold (14,074 to 17,030), there is a reasonable chance that the Quiet Zone Risk Index may some day exceed the Nationwide Significant Risk Threshold. This would result in the quiet zone no longer being quali-

fied and additional steps would have to be taken to keep the quiet zone. Therefore, the public authority decides to reduce the risk further by the use of traffic channelization devices at A Street. Table 4 shows the results of this change. The Quiet Zone Risk Index is now 10,320.75 which is less than the Risk Index with Horns of 11,250. The quiet zone now qualifies by fully compensating for the loss of train horns and will not have to undergo annual reviews of the Quiet Zone Risk Index.

TABLE 4

Street	Crossing risk index w/horns	Crossing risk index w/o horns	SSM EFF	Crossing risk index w/o horns plus SSM
A	12000	20016	0.75	5004
B	10000	16680	0	16680
C	8000	13344	0	13344
D	15000	25020	0.75	6255
	RIWH			QZRI
	11250			10320.75

Example 2—Pre-Rule Quiet Zone

(a) A public authority wishes to qualify a Pre-Rule Quiet Zone which did not meet the requirements for Automatic Approval because the Quiet Zone Risk Index is greater

than twice the Nationwide Significant Risk Threshold. There are four public crossings in the Pre-Rule Quiet Zone. Three of the crossings are equipped with flashing lights and gates, and the fourth (Z Street) is passively signed with a STOP sign. The length of the

quiet zone is 0.6 mile, and there are no private crossings within the proposed zone.

(b) The tables that follow are very similar to the tables in Example 1. The street name is shown in the first column, and the existing risk index for each crossing ("Crossing Risk Index w/o Horns") in the second. This is a change from the first example because the risk is calculated without train horns sounding because of the existing ban on whistles. The third column, "Crossing Risk Index w/ Horns", is the risk index for each crossing after it has been adjusted to reflect what the risk would have been had train horns been sounding. This is mathematically done by dividing the existing risk index for the three gated crossing by 1.668. The risk at the passive crossing at Z Street is divided by 1.749. (See the above discussion in "Pre-Rule Quiet Zones—Establishment Overview" for more information.) The fourth column, "SSM Eff", is the effectiveness of the SSM at the crossing. A zero indicates that no SSM has been applied. The last column, "Crossing Risk Index w/o Horns Plus SSM", is the risk index without horns for the crossing after being reduced for the implementation of the SSM. At the bottom of the table are two val-

ues. The first is the Risk Index with Horns (RIWH), which represents the average initial amount of risk in the proposed quiet zone with the train horn sounding. The second is the Quiet Zone Risk Index ("QZRI"), which is the average risk in the proposed quiet zone taking into consideration the increased risk caused by the lack of train horns and reductions in risk attributable to the installation of SSMs. Once again it is assumed that the Nationwide Significant Risk Threshold is 17,030. The Quiet Zone Risk Index must be reduced to either the Nationwide Significant Risk Threshold (17,030) or to the Risk Index with Horns in order to qualify under the rule.

(c) Table 5 shows the existing conditions in the proposed quiet zone. SSMs have not yet been installed. The Risk Index with Horns for the proposed quiet zone is 18,705.83. The Quiet Zone Risk Index without any SSMs is 31,375. Since the Nationwide Significant Risk Threshold is less than the calculated Risk Index with Horns, the public authority's goal will be to reduce the risk to at least value of the Risk Index with Horns. This will qualify the Pre-Rule Quiet Zone under the rule.

TABLE 5

Street	Crossing risk index w/o horns	Crossing risk index w/ horns	SSM EFF	Crossing risk index w/o horns plus SSM
W	35,000	20,983.21	0	35,000
X	42,000	25,179.86	0	42,000
Y	33,500	20,083.93	0	33,500
Z	15,000	8,576.33	0	15,000
	RIWH .....	.....	.....	QZRI
	18,705.83	.....	.....	31,375

(d) The Z Street crossing is scheduled to have flashing lights and gates installed as part of the state's highway-rail grade crossing safety improvement plan (Section 130). While this upgrade is not directly a part of the plan to authorize a quiet zone, the public authority may take credit for the risk reduction achieved by the improvement from a passive STOP sign crossing to a crossing

equipped with flashing lights and gates. Unlike New Quiet Zones, upgrades to warning devices in Pre-Rule Quiet Zones do contribute to the risk reduction necessary to qualify under the rule. Table 6 shows the quiet zone corridor after including the warning device upgrade at Z Street. The Quiet Zone Risk Index has been reduced to 29,500.

TABLE 6

Street	Crossing risk index w/o horns	Crossing risk index w/ horns	SSM EFF	Crossing risk index w/o horns plus SSM
W	35,000	20,983.21	0	35,000
X	42,000	25,179.86	0	42,000
Y	33,500	20,083.93	0	33,500
Z	7,500	8,576.33	0	7,500
	RIWH .....	.....	.....	QZRI
	18,705.83	.....	.....	29,500

(e) The public authority elects to install four-quadrant gates without vehicle presence detection at X Street. As shown in Table 7,

this reduces the Quiet Zone Risk Index to 20,890. This risk reduction is not sufficient to qualify as quiet zone under the rule.

TABLE 7

Street	Crossing risk index w/o horns	Crossing risk index w/ horns	SSM EFF	Crossing risk index w/o horns plus SSM
W	35,000	20,983.21	0	35,000
X	42,000	25,179.86	0.82	7,560
Y	33,500	20,083.93	0	33,500
Z	7,500	8,576.33	0	7,500
	RIWH			QZRI
	18,705.83			20,890

(f) The public authority next decides to use traffic channelization devices at W Street. Table 8 shows that the Quiet Zone Risk Index is now reduced to 14,327.5. This risk re-

duction fully compensates for the loss of the train horn as it is less than the Risk Index with Horns. The quiet zone is qualified under the rule.

TABLE 8

Street	Crossing risk index w/o horns	Crossing risk index w/ horns	SSM EFF	Crossing risk index w/o horns plus SSM
W	35000	20983.21	0.75	8750
X	42000	25179.86	0.82	7560
Y	33500	20083.93	0	33500
Z	7500	8576.33	0	7500
	RIWH			QZRI
	18705.83			14327.5

APPENDIX D TO PART 222—DETERMINING RISK LEVELS

INTRODUCTION

The Nationwide Significant Risk Threshold, the Crossing Corridor Risk Index, and the Quiet Zone Risk Index are all measures of collision risk at public highway-rail grade crossings that are weighted by the severity of the associated casualties. Each crossing can be assigned a risk index.

(a) The *Nationwide Significant Risk Threshold* represents the average severity weighted collision risk for all public highway-rail grade crossings equipped with lights and gates nationwide where train horns are routinely sounded. FRA developed this index to serve as a threshold of permissible risk for quiet zones established under this rule.

(b) The *Crossing Corridor Risk Index* represents the average severity weighted collision risk for all public highway-rail grade crossings along a defined rail corridor.

(c) The *Quiet Zone Risk Index* represents the average severity weighted collision risk for all public highway-rail grade crossings that are part of a quiet zone.

THE PREDICTION FORMULAS

(a) The Prediction Formulas were developed by DOT as a guide for allocating scarce traffic safety budgets at the State level. They allow users to rank candidate crossings for safety improvements by collision probability. There are three formulas, one for each warning device category:

1. automatic gates with flashing lights;
2. flashing lights with no gates; and
3. passive warning devices.

(b) The prediction formulas can be used to derive the following for each crossing:

1. the predicted collisions (PC)
2. the probability of a fatal collision given that a collision occurs (P(FC|C))
3. the probability of a casualty collision given that a collision occurs (P(CC|C))

(c) The following factors are the determinants of the number of predicted collisions per year:

1. average annual daily traffic
2. total number of trains per day
3. number of highway lanes
4. number of main tracks
5. maximum timetable train speed
6. whether the highway is paved or not
7. number of through trains per day during daylight hours